

IN THE CLAIMS

Please add new claims 19-26, and amend claims 1-18 as follows:

1. (CURRENTLY AMENDED) A ~~gallium~~ Group-III nitride (~~GaN~~) based light emitting diode (LED), wherein light is extracted through a surface of the nitrogen face (N-face) of the Group-III nitride based LED and a the surface of the N-face of the Group-III nitride based LED is ~~roughened~~ structured so that the light is extracted out of the Group-III nitride based LED.
2. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 1, wherein the surface of the N-face is ~~roughened~~ structured into one or more cones.
3. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 1, wherein the ~~roughened~~ structured surface reduces light reflections occurring repeatedly inside the LED, and thus extracts more light out of the LED.
4. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 1, wherein the surface of the N-face is ~~roughened~~ structured by an anisotropic etching.
5. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 4, wherein the anisotropic etching is a dry etching.
6. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim ~~[[4]]~~ 25, wherein the ~~anisotropic~~ wet etching is a photo-enhanced chemical (PEC) etching.
7. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 1, wherein the N-face is an n-type layer of the ~~GaN~~ LED.
8. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 1, wherein the N-face is prepared by a laser lift off (LLO) technique.

9. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 1, wherein the LED is grown on a c-plane GaN wafer and a gallium face (Ga-face) is a p-type layer.

10. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 1, wherein the LED is comprised of an n-type electrode, n-type layer, active region, p-type layer and p-type electrode.

11. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 10, wherein the n-type layer, active region and p-type layer are each comprised of a (B, Al, Ga, In)N alloy.

12. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 10, wherein the p-type electrode has a property of high reflection to decrease light absorption and to increase light reflection toward the surface of the n-type layer.

13. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 10, wherein the LED includes a current-blocking layer aligned under the n-type electrode to keep the current from concentrating below the n-type electrode, so that absorption of light emission under the n-type electrode can be avoided and extraction efficiency can be increased.

14. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 10, wherein the LED includes a current-confining frame made of an insulator to restrain leakage current through the sidewalls of the LED without significantly decreasing an emitting area.

15. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 2, wherein the ~~roughened~~ structured surface is comprised of a plurality of hexagonal shaped cones that have an angle equal to or smaller than:

$$2 \sin^{-1}(n_{air} / n_s) \approx 47.2^\circ$$

for ~~GaN~~, where n_{air} is a refractive index of air and n_s is a refractive index of ~~GaN~~ the Group-III nitride.

16. (CURRENTLY AMENDED) The ~~GaN~~ LED of claim 2, wherein the ~~roughened~~ structured surface is comprised of a plurality of hexagonal shaped cones that have an angle equal to or smaller than:

$$2 \sin^{-1}(n_{enc} / n_s)$$

for epoxy, where n_{enc} is a refractive index of epoxy and n_s is a refractive index of ~~GaN~~ the Group-III nitride.

17. (CURRENTLY AMENDED) A method of creating a ~~gallium~~ Group-III nitride (GaN) based light emitting diode (LED), wherein light is extracted through a structured surface of a nitrogen face (N-face) of the LED, comprising:

~~roughening a~~ structuring the surface of the N-face ~~into one or more cones after growth to~~ extract light out of the Group-III nitride based LED.

18. (CURRENTLY AMENDED) A Group-III nitride based light emitting diode (LED) comprised of an n-type electrode, n-type layer, active region, p-type layer and p-type electrode, wherein a nitrogen face (N-face) surface of the n-type layer is ~~roughened by an anisotropic etching into one or more cones and~~ structured after growth, so that light is extracted through the ~~roughened~~ structured N-face surface of the n-type layer.

19. (NEW) The method of claim 17, wherein the surface of the N-face is structured into one or more cones.

20. (NEW) The method of claim 17, wherein the N-face surface of the n-type layer is structured using an anisotropic etching.

21. (NEW) The method of claim 20, wherein the anisotropic etching is a dry etching.

22. (NEW) The method of claim 20, wherein the anisotropic etching is a wet etching.

23. (NEW) The method of claim 22, wherein the wet etching is a photo-enhanced chemical (PEC) etching.

24. (NEW) The method of claim 17, wherein the surface of the N-face is structured by roughening or patterning.

25. (NEW) The LED of claim 4, wherein the anisotropic etching is a wet etching.

26. (NEW) The LED of claim 1, wherein the surface of the N-face is structured by roughening or patterning.